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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,895	07/10/2003	Robert P. Meagley	ITL.0907US (P15299)	1697
21906	7590	09/09/2004	EXAMINER	
TROP PRUNER & HU, PC 8554 KATY FREEWAY SUITE 100 HOUSTON, TX 77024			THORNTON, YVETTE C	
			ART UNIT	PAPER NUMBER
			1752	

DATE MAILED: 09/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/616,895

Applicant(s)

MEAGLEY ET AL.

Examiner

Yvette C. Thornton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10062003.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This is written in reference to application number 10/616,895 filed on July 10, 2003.

Information Disclosure Statement

1. The Information Disclosure Statement filed on October 6, 2003 has been entered and fully considered.

Claim Interpretation

2. Claims 19-24 pertain to a polymer precursor, while claims 9-18 pertain to a photodefinable polymer. Both the said precursor and the said polymer comprise a photodefinable precursor and a filler. The examiner has interpreted the instant claims to pertain to a composition that has not been exposed (i.e., precursor) and one that has been exposed (i.e., polymer). The examiner notes that no process steps have been claimed. This interpretation is in light of the specification disclosure that the taught precursor is an uncured polymer (pg. 2, l. 4-6).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Meagley et al. (US 2004/0131970 A1). Meagley teaches a polymer system for semiconductor applications formed by blending a filler material and a precursor for a photodefinable polymer (abstract). The said system is then cured to form a cross-linked polymer layer (p. 0006). The

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photodefinable matrix may include a polymer or polymer precursor. Suitable examples include polyimide, polyimide precursors, polybenzoxazole (PBO), PBO precursors, poly(meth)acrylates, alicyclic polymers, polyolefins, benzocyclobutene, benzocyclobutene precursors, fluorinated derivatives of benzocyclobutene, polycarbonates and epoxies (p. 0006). The filler may have a relatively small particle size so as to be non-scattering to the radiation used to photodefine the resulting composite system. Preferably the particle size is less than 100 nm, more preferably less than 20 nm (p. 0008). Examples of suitable fillers include metal oxides such as silica, clays, alumina, titania, zirconia, and glass (p. 0009). The use of metal oxides may be advantageous in some embodiments because they contribute good chemical resistance to solvent-based strippers, increased transparency and low coefficient of thermal expansion to the final formulation. In one preferred embodiment zirconia particles approximately 13 nm in diameter may be incorporated into the taught system in the amount of 9-20% by weight. In one example, the matrix polymer precursor is PBO. In other embodiments, the filler may constitute from about 5-80% by weight (p. 0010). See also claims 1-2, 6-7, 9-10, 12, 15, 16, 20, 24, 26, 29-30, 32 and 35.

5. The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

6. Claims 1, 3, 4-9, 11-15, 17-19, 21-25, 27-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Sezi (US 2002/0132061 A1). Example 5 of Sezi exemplifies the preparation of a formulation wherein 30g. of polyhydroxyamide (PBO precursor) and 3g. of fine silica are homogeneously mixed into a solution by means of a high-speed stirrer (p. 0059). The said composition is then coated onto a silicon disc and dried to form a film layer. The said layer is

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then heat-treated to convert the polyhydroxyamide into polybenzoxazole (PBO) (p. 0060). Although the said example fails to explicitly discuss the particle size of the fine silica, Sezi teaches that the material dispersed in the polymer has a particle size of <1000 nm, preferably <100nm, with particular preference being given to particle sizes in the range of 0.5-50 nm, more preferably 0.5-20 nm (p. 0034). One of ordinary skill in the art would readily envisage the preferred composition of example 5 comprising fine silica having a particle size in the most preferred range of 0.5-20 nm.

It is the examiner's position that prior to heat-treatment, the exemplified composition meets the limitations of a polymer precursor as set forth in instant claims 19 and 20-24. After heat treatment, the exemplified composition meets the limitations of a photodefinable polymer as set forth in instant claims 9, 11-15 and 17-18. Sezi clearly discloses that the taught invention relates to substrates, which occur in chip technology and in electronic components (i.e., integrated circuits) (p. 0001-0002).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2, 10, 16, 20 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sezi (US 2002/0132061 A1) as applied to claims 1, 3-9, 11-15, 17-19, 21-25, 27-30 above, and further in view of Hattori et al. (US 5,116,885 A). Sezi teaches all the limitations of the instant claims, except it fails to teach the use of zirconia as a suitable filler. It is the examiner's position that zirconia and silica are well known in the art as variants. This position is supported by Hattori, which discloses that suitable inorganic fillers include silica, zirconia, titanium

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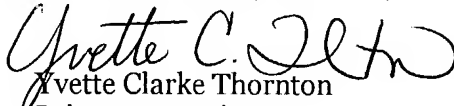
silicate, etc. (c. 2, l. 63-c.3, l. 3). One of ordinary skill in the art would have been motivated by what is well known and conventional in the art, as taught by Hattori, to substitute the exemplified silica particles of Sezi for zirconia particles and expect reasonably similar results.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 571-272-1336. The examiner can normally be reached on Monday-Thursday 8-6:30.

10. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Yvette Clarke Thornton
Primary Examiner
Art Unit 1752

yct
September 3, 2004